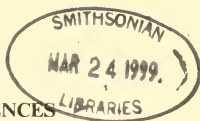


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TWO NEW GENERA AND TWO NEW SPECIES OF DEEPWATER  
WESTERN ATLANTIC WORM EELS  
(PISCES: OPHICHTHIDAE)

By

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**ABSTRACT:** Two new genera and two new species of Atlantic worm eels, family Ophichthidae, subfamily Myrophinae, tribe Myrophini, are described and illustrated. *Mixomyrophis pusillipinna*, gen. nov., sp. nov., trawled from deepwater off the Lesser Antilles, is an elongate species with uniserial conical teeth, a labial posterior nostril, a minute pectoral fin, and 178 vertebrae. *Asaracenchelys longimanus*, gen. nov., sp. nov., collected off Belém Brazil, is an elongate species with biserial conical teeth, a labial posterior nostril, well-developed pectoral fins, and 149 vertebrae. Osteological characteristics of the new genera are described from radiographs and compared with those of related myrophines.

INTRODUCTION

The ophichthid worm eels of the subfamily Myrophinae (sensu McCosker 1977) occupy a variety of sand and mud habitats as well as the midwater environment, ranging from the shallow intertidal to depths of 400 fathoms or more. The shallow-water species of the genera *Myrophis*, *Muraenichthys*, and *Ahlia* are common in collections and are probably abundant within their milieu. The deeper water species are rare, being difficult to trawl or dredge, and are often known from but a single specimen.

While preparing the ophichthid eel section of The Fishes of the Western North Atlantic (FWNA), the late James E. Böhlke discovered a single specimen of a new species of myrophine collected by trawl off Anguilla, Lesser Antilles. In taking over the completion of the FWNA project, I discovered another new species of deep-water myrophine, from Brazil, which is also generically distinct. I intend to make these

taxonomic names available for the FWNA volume and to describe the significant osteological characters that are visible by radiographic examination. It is my hope that subsequent specimens will be discovered, which will allow a more thorough osteological examination and comparison with other myrophine genera.

MATERIALS AND METHODS

Measurements are straight-line, made either with a 300-mm ruler with 0.5-mm gradations (for total length, trunk length, and tail length) and recorded to the nearest 0.5 mm, or with dial calipers (all other measurements) and recorded to the nearest 0.1 mm. Body length comprises head and trunk lengths. Head length was measured from the snout tip to the posterodorsal margin of the gill opening; trunk length was taken from the end of the head to mid-anus; maximum body depth did not include the median fins. Vertebral counts (which included the hypural) were



FIGURE 1. Holotype of *Mixomyrophis pusillipinna* McCosker, sp. nov., ANSP 152305, 407 mm TL. Inset: Head of holotype of *Mixomyrophis pusillipinna* McCosker, sp. nov.

taken from radiographs. Stained and cleared gill arches were prepared using the Taylor (1967) trypsin technique. Institutional abbreviations of material examined are explained in the acknowledgments section of this paper.

#### *Mixomyrophis* McCosker, gen. nov.

TYPE SPECIES.—*Mixomyrophis pusillipinna* McCosker, sp. nov.

DIAGNOSIS.—An elongate myrophine, tribe Myrophini, with tail longer than head and trunk, laterally compressed, particularly posteriorly; snout subconical, broad from above, not grooved ventrally; anterior nostril tubular, posterior nostril on outer edge of lip and covered by a flap; dorsal fin origin in mid-trunk; pectoral fin a minute flap in posterodorsal corner of upper gill opening; eye large, behind middle of jaw; third preopercular pore present; head and lips smooth, without cirri or lappets; teeth of jaws and vomer small, conical, uniserial, and close set, with slightly retrorse tips; gill arches well developed for a myrophine, first basibranchial ossified, upper pharyngeal toothplates fused; neurocranium stout, slightly sloping posteriorly; suspensorium anteriorly inclined; pterygoid stout, not bracing maxilla; maxillae elongate, tapering posteriorly; opercular series apparently moderately developed; pectoral girdle reduced to a slender clei-

thrum and supracleithrum; epipleural ribs on all precaudal vertebrae; caudal transverse processes apparently absent; caudal vertebrae more numerous than precaudal. Other characteristics those of single species.

ETYMOLOGY.—From the Greek *μῆσις*, *mixis*, a mixing, and *Myrophis* (masculine), a genus of ophichthid eel. Named in reference to the combination of myrophine characters that this eel possesses.

#### *Mixomyrophis pusillipinna* McCosker, sp. nov. (Figures 1, 2, 6b)

HOLOTYPE.—ANSP 152305 (originally UMML 30290), 407 mm, a female with ripening ovaries, captured off Anguilla, Lesser Antilles (18°26.4'N, 63°12.6'W to 18°28'N, 63°11.1'W), by 10-m otter trawl, between 393–451 m depth, by the RV Pillsbury, sta. 984, on 22 July 1969.

COUNTS AND MEASUREMENTS (IN MM).—Total length 407; head length 36.5; trunk length 115.5; tail length 255; body depth at gill openings 9.0; body width at gill openings 7.1; body depth at anus 8.8; body width at anus 6.0; gill opening 1.5; snout tip to origin of dorsal fin 94; left pectoral fin length 1.0; snout length 7.9; upper jaw length 12.1; eye diameter 2.9; fleshy interorbital distance 4.2 Total vertebrae 178; predorsal vertebrae 33; preanal vertebrae 57.

DESCRIPTION.—Body elongate, its depth 45 in total length (TL), laterally compressed in tail region. Head and trunk 2.7 and head 11.2 in TL.

Snout subconical, broad as seen from above; lower jaw included, its tip reaches the anterior

nostril bases. Anterior nostrils tubular, directed ventrally, their anterior edge looped upward; posterior nostril at outer edge of lip, covered by a flap.

Eye large, its anterior edge behind midpoint of upper jaw.

Gill opening mid-lateral, a constricted opening.

Median fins low, lying partially within a groove, but elevated above last 20 vertebrae, meeting each other and extending beyond caudal tip. Dorsal fin arises above posterior trunk region. Pectoral fin minute.

Head pores developed. Single temporal and interorbital pores. Six pores along left mandible; 5 along right. Two pores between anterior and posterior nostrils. Four supraorbital pores. Three preopercular pores. Left lateral line pores ca. 149; 9 above branchial basket; 57 before anus.

Teeth small, conical, nearly uniform in size. An intermaxillary chevron of 8 teeth, followed by 2 on each side, closely adjoining ca. 20 uniserial vomerine teeth and 25 maxillary teeth. Approximately 30 uniserial mandibular teeth, with a secondary pair at symphysis.

Gill arches removed, stained and cleared. Basibranchial 1 ossified, basibranchials 2-4 absent. Hypobranchials 1 and 2 ossified; hypobranchial 3 cartilaginous. Ceratobranchials 1-4 ossified; ceratobranchial 5 absent. Infrapharyngobranchials 2 and 3 ossified.

Lower tooth plate small, with 2 rows of conical teeth, medial row largest. Upper pharyngeal tooth plate fused, subrectangular, with 4-5 rows of conical teeth, medial row largest.

Body color in isopropyl alcohol yellow on head, chin, tail, and dorsal surface of trunk. Throat and belly whitish. Finely peppered throughout body and tail with small brown specks. Peritoneum black.

**ETYMOLOGY.**—From the Latin *pusillus*, puny or insignificant, and *pinna*, fin, to be treated as a noun in apposition.

**REMARKS.**—*Mixomyrophis* is separable from all other myrophines by the combination of its minute pectoral fin, elongate body, and posterior nostril located within the outer lip. *Mixomyrophis* appears most similar to the elongate species of *Pseudomyrophis*, which differ by having the posterior nostril before the eye, more extreme body elongation, a reduced and rounded neurocranium (cf. Fig. 6b and 6d), and reduced gill

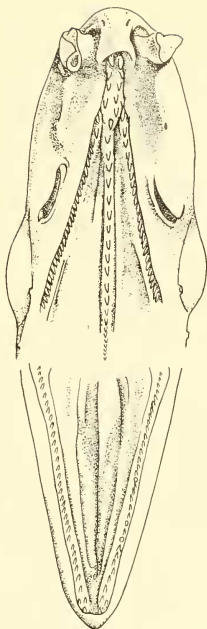


FIGURE 2. Dentition of holotype of *Mixomyrophis pusillipinna* McCosker, sp. nov., ANSP 152305.

arch components (Böhlke 1960; McCosker 1977). The nostril condition of *Pseudomyrophis* appears to be a slight posterodorsal translocation of the opening from its location along the lip (although it is difficult to interpret which state might be the primitive condition), and the other characters seem to be advanced specializations. The nearly bulbous snout, large eye, and body elongation of *Mixomyrophis* are conditions shared by other deepwater myrophines such as the species of *Pseudomyrophis*, *Neenchelys*, *Asarcenchelys longimanus*, and *Muraenichthys puhioilo* McCosker (1979).



FIGURE 3. Reconstructed appearance of holotype of *Asarcenchelys longimanus* McCosker, sp. nov., MNHN 1968-215, 277 mm TL. The actual specimen is intact, but badly torn in the anterior trunk region.

### *Asarcenchelys* McCosker, gen. nov.

TYPE SPECIES.—*Asarcenchelys longimanus* McCosker, sp. nov.

DIAGNOSIS.—A very elongate myrophine, tribe Myrophini, with tail longer than head and trunk, laterally compressed throughout trunk and tail; snout subconical, tumid, not grooved ventrally; anterior nostril tubular; posterior nostril on outer edge of lip and covered by a flap that is incised posteriorly; dorsal fin origin in anterior trunk region; anal fin elevated; pectoral fin lanceolate, well developed, slightly longer than snout; eye large, behind middle of jaw; third preopercular pore present; head and lips smooth, without cirri or lappets; teeth of jaws and vomer large, not close set, conical and slightly recurved; teeth biserial anteriorly in jaws and vomer, outer row smaller; gill arches appear to be well developed for a myrophine; neurocranium stout, truncate posteriorly; supraoccipital crest developed; suspensorium posteriorly inclined; maxillae taper posteriorly; pectoral girdle reduced to stout

cleithrum and thin supracleithrum; epipleural ribs present only on anterior trunk vertebrae; caudal temporal processes apparently absent; caudal vertebrae more numerous than precaudal. Other characteristics those of single species.

ETYMOLOGY.—From the Greek *ασαρκος*, *asarkos*, lean, and *ενχελος*, *enchelys*, eel (treated as feminine according to Opinion 915 of the Bulletin of Zoological Nomenclature, 1970), in reference to its emaciated appearance.

### *Asarcenchelys longimanus* McCosker, sp. nov.

(Figures 3–5, 6c)

HOLOTYPE.—MNHN 1968-215, 277 mm, sex undetermined, captured near Belém, Brazil, at 55 m depth by P. Fourmanoir, September 1966.

PARATYPE.—MNHN B. 2994, 147 mm, sex undetermined, collected with the holotype.

COUNTS AND MEASUREMENTS (IN MM).—Data for the paratype parenthetically follow those of the holotype. Total length 277 (147); head length 27 (18); trunk length 78 (46); tail length 172 (83); body depth behind gill openings 3.8 (~2); body width behind gill openings 3.6 (1.4); body depth at anus ~1.5 (~2);

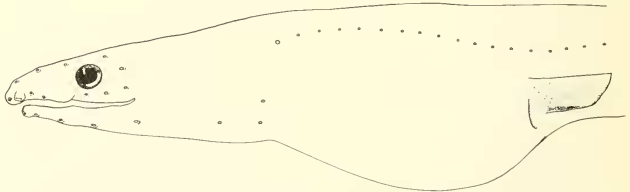


FIGURE 4. Head of holotype of *Asarcenchelys longimanus* McCosker, sp. nov., MNHN 1968-215.

body width at anus 1.5 (1.2); gill opening 1.4 (0.9); snout tip to dorsal fin origin 55 (34); left pectoral fin length 4.0 (3.3); snout length 3.8 (3.7); upper jaw length 6.6 (5.8); eye diameter 1.4 (1.3); fleshy interorbital distance 1.6 (1.3). Total vertebrae 148 (131, tail incomplete); predorsal vertebrae 27 (27); preanal vertebrae 53 (55).

**DESCRIPTION.**—Body very elongate, its depth 72.9–73.5 in TL, laterally compressed behind head. Head and trunk 2.3–2.6, and head 8.2–10.3 in TL.

Snout subconical, bulbous; lower jaw included, its tip reaches to front of anterior nostril bases, leaving several intermaxillary teeth exposed. Anterior nostrils tubular, directed ventrally; posterior nostril at outer edge of lip, covered by a flap whose posterior edge is incised.

Eye large, anterior edge of orbit above middle of upper jaw.

Gill openings mid-lateral, not as constricted as those of most myrophines, about equal in length to isthmus.

Dorsal fin low, arising in anterior trunk region. Anal fin elevated. Median fins expanded in posterior tail region, extended beyond caudal tip. Pectoral fin lanceolate, broad based, well developed for a myrophine.

Head pores developed, much more apparent than those of lateral line. Single temporal and interorbital pores. Five pores along mandible, widely spaced posteriorly. Two pores between anterior and posterior nostrils. Four supraorbital pores. Three preopercular pores. Lateral line pores difficult to discern; 14 above branchial basket.

Teeth conical, fairly large for a myrophine, not close set, nearly uniform in size, recurved. An intermaxillary chevron of 6 teeth, visible when mouth is closed, followed by closely abutting vomerine dentition consisting of 3–4 pairs of teeth and a uniserial row of 13 teeth. Maxillary teeth biserial anteriorly, with an inner row of 6 teeth and an outer row of 22–24 smaller teeth. Lower jaw biserial anteriorly, with an inner row of 5 teeth and an outer row of 23–25 smaller teeth.

Gill arches, as viewed from radiograph, appear to be myrophin-like and not reduced. First basibranchial is ossified, others appear to be cartilaginous or absent. Hypobranchials 1 and 2 ossified; hypobranchial 3 appears cartilaginous or absent. Ceratobranchials 1–4 ossified; ceratobranchial 5 not apparent.

Upper and lower tooth plates appear to have 2–3 rows of conical teeth; upper plate appears to be fused.

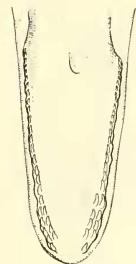
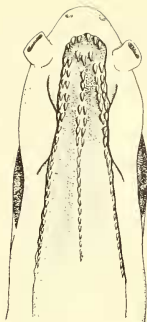


FIGURE 5. Dentition of holotype of *Asarcenchelys longimanus* McCosker, sp. nov., MNHN 1968-215.

Body coloration in isopropyl alcohol cream to white, numerous fine, chocolate-brown spots overlying snout, dorsal surface, and area behind eye. All fins transparent. Peritoneum light colored.

**ETYMOLOGY.**—From the Latin *longus*, long, and *manus*, hand, to be treated as a noun in apposition. Named with reference to the elongate pectoral fins.

**REMARKS.**—This new myrophine is separable from all related ophichthids by a combination of internal and external morphological charac-

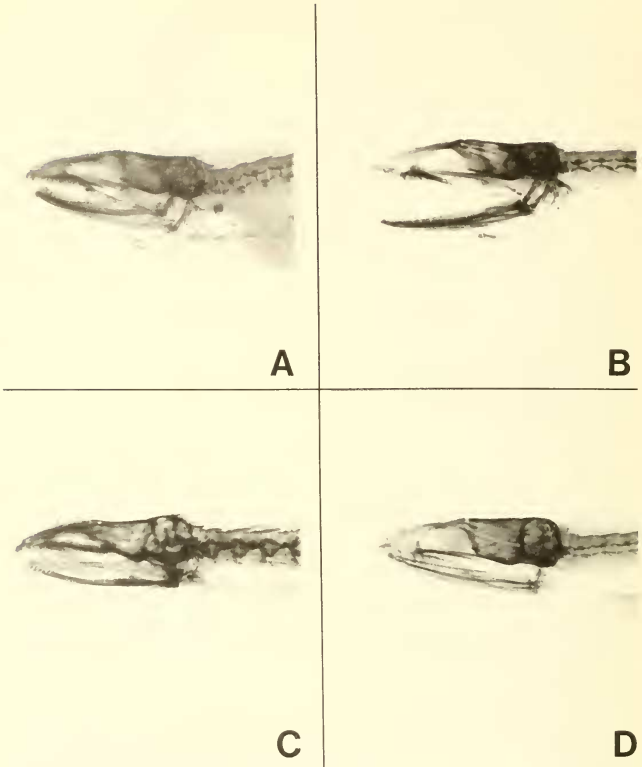


FIGURE 6. Enlarged radiographs of neurocrania of selected myrophins: A) *Myrophis vafer*, CAS 17823, 220 mm TL. B) *Mixomyrophis pusillipinna*, ANSP 152305, 407 mm TL. Gill arches have been removed. C) *Asarcenchelys longimanus*, MNHN 1968-215, 277 mm TL. D) *Pseudomyrophis micropinna*, CAS 50978, 109 mm TL.

ters. Particularly significant are its well-developed pectoral fins, posterior nostril located on the edge of the lip, elongate body and tail, and elongate dentition. The body elongation, anal fin

development, nostril location, and snout shape are not unlike those of certain species of *Neeenchelys* and *Pseudomyrophis* (cf. McCosker 1982; Smith and Böhlke 1983), and are probably

adaptive for living in deepwater soft benthic habitats. Its close affinities, however, lie with the species of *Myrophis*, which share with it the derived character state of having lost epipleural ribs beyond the fifteenth vertebra, a condition shared as well with *Ahlia egmontis*. *Asarcenchelys longimanus* also shares with the species of *Myrophis* the primitive states of neurocranial shape (Fig. 6a, 6c), gill arch condition, and pectoral fin development. Species of *Pseudomyrophis* and *Neenchelys* are further specialized and separable from the "Myrophis group" in having a much-reduced neurocranium, and posterior nostrils before the eye and lacking a flap (McCosker 1977, 1982).

It should be noted that both specimens of *A. longimanus* are damaged and thereby the total length measurement of each specimen may be in error by a few percent. The paratype is intact, but the radiograph indicates that the tail has probably been severed and regrown. The specimen has 17 fewer vertebrae than the holotype. During capture the holotype was broken behind vertebra 15 and is twisted in preservative. The head remains attached by the skin to the trunk region and is sufficiently intact to allow precise measurements to be taken and characters to be analyzed.

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